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ADHESIVE PLASTER

ITS HISTORY MANUFACTURE AND USES

Johnson & Johnson

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A DHESIVE PLASTER

ITS HISTORY MANUFACTURE AND USES



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The Purpose of this Booklet

There is a constant demand for a publication showing methods of using adhesive plaster. This booklet therefore has been published in response to this demand for such information and data. Some general information about adhesive plaster, including its history, is also contained in these pages.

Many ingenious surgeons have contributed to this account of the varied uses of adhesive plaster. The illustrations have been mostly made direct from actual photographs and are so arranged as to show the methods so clearly that they may readily be followed with but little explanatory text.

Little of the information given herein makes any claim to newness. Most physicians are more or less conversant with many of the procedures indicated. The illustrations are chiefly useful as reminders of methods and technic to be followed.

It is our hope and belief the booklet will be helpful.

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The History of Adhesive Plaster

If you boil together, water, olive oil and lead oxide (litharge), glycerin is set free and gives a distinctly sweetish taste to the water. Oils are glycerides of fatty acids. Olive oil is composed of glycerin and oleic acid. The lead combines with the oleic acid of the olive oil and the result is the formation of a yellow mass variously called lead plaster, diachylon plaster or Emplastrum Plumbi.

This is a very old formula and its history goes back many centuries. The old name diachylon is of Greek origin. Directions for its preparation, run through many old formula books and through all the pharmacopoeias, ancient and modern, and are still retained in the present U. S. P. (revision IX) under the title Emplastrum Resinae or Rosin Plaster. This is simply a mixture of the old diachylon plaster with rosin and yellow beeswax.

It is still made on a manufacturing scale and sold in the United States under various names and while largely displaced by the more convenient rubber-base plasters, yet it still has some adherents who claim it to be superior for certain purposes, to the present-day rubber plasters.

In so far as irritating properties are concerned, the old diachylon plaster has been claimed to be not only absolutely free from them but on the contrary, distinctly soothing in many conditions and was used as a direct wound-dressing. Adhesive plasters made of rubber-base were originally at times irritating to some persons under some conditions and it was a matter of long labor to overcome this tendency.

Up to about the year 1898 the only known form of rubber-adhesive plaster was the original yellow-colored variety and on account of the occasional cases of irritation of the skin upon its long-continued application, it was the privilege of Johnson & Johnson, in co-operation with several leading American surgeons, to enter into a long series of experiments with the object in view of eliminat-

ing the irritating character. Among other materials, oxide of zinc was experimented with as an ingredient likely to produce a plaster with less irritating qualities, and finally after many experiments and failures, a plaster-mass was devised incorporating, among other ingredients, twenty per cent of this material. In order to produce the desired result, however, it was found necessary entirely to revise all former ideas of plaster-making, and finally a plaster of almost no irritating quality was produced and marketed under the name "ZO" Adhesive.

So complete has been the displacement of the old lead plaster by rubber-base plasters that when the term is used, adhesive plaster made of rubber is supplied with scarcely a thought that there may be another kind. Everywhere rubber-base plaster, either plain or perforated, cut in varying widths and lengths, is employed.

The modern adhesive plaster has been so modified as to admit of a larger range of application than could possibly have existed if use had been confined to the old diachylon. The ingenuity of surgeons and of others has found many and novel uses for this plaster. The old plaster was not adhesive at a temperature anywhere near that of an ordinary room nor of the body. It requires heating over a flame to melt the coating of plaster-mass just before application; hence the modern adhesive which will "stick" anywhere and to anything at such temperatures as commonly are found, is obviously a vast improvement over the old variety.

The question is often asked: Of what is the modern rubber adhesive plaster made? A comprehensive answer to this question, is that it is made by mixing with rubber, a dough made of pitch, gums, waxes and powdered orris root. That is the essential base of all first-class modern rubber adhesive plaster, whether medicated or not.

Because of its immense advantages the use of rubber-base plasters has caused the re-enthronement of adhesive plaster as one of the most important adjuncts of modern surgery.

Suggestions for Preservation and Use

To preserve adhesive plaster, keep it in a cool dark place. Protect it especially from direct sunlight. Protect from direct exposure to air. Its keeping qualities are wholly dependent upon these conditions. When a little is used from a large roll, wrap the roll and replace in its box or can and close the lid.

Clean skin. The skin must be clean and dry before application and much better adhesion is secured if it is carefully freed from grease. Perspiration and the salts which its evaporation leaves on the skin, may produce a considerable irritation under adhesive plaster if the application is of long duration.

Avoid hair. The hair should be shaved from the skin where the plaster is to be applied if good adhesion is to be expected and especially is this good advice from the viewpoint of the patient, when removal is attempted.

Narrow strips. On irregular surfaces, as joints, etc., it must be borne in mind that a number of narrow strips can be applied in a much better and neater fashion than fewer strips of greater width.

Economy. In using from a spool, it is more economical to apply the end and unroll from the spool, similarly to the usual procedure of applying a roller bandage. This will entail much less loss than will the practice of cutting off numerous lengths, judged to be correct for the purpose.

Large rolls. In handling large rolls, when applying large sheets of plaster to the ribs, etc., annoyance from the sticking together, face-to-face, of parts that may accidentally touch each other, will be avoided by removing the face-cloth only as the application of the plaster proceeds. It is quite difficult to separate layers of plaster that have made contact face-to-face.

Constriction. Applying plaster to an extremity naturally constricts it to some extent. Therefore wrap from

the tips inward, elevate the limb or slit the whole dressing after application is completed.

Bandaging. Wherever possible cover the application of adhesive plaster with a neatly applied bandage. This assists in retaining it in position, keeps it neat and clean and prevents the possibility of its unrolling and sticking to the clothing and bed linen.

Waterproofing. Wherever it is desirable to waterproof adhesive plaster, it is easily accomplished by painting the back of it, after application, with collodion. Shellac or any other kind of varnish may be used if preferable. To a limited extent a plaster dressing so treated may be immersed in water and washed with impunity.

Removal. The removal of adhesive plaster is a matter frequently discussed. We have often recommended the application of alcohol to the inner surface, while peeling back the plaster from the skin. This is quite successful if carefully and properly done, as alcohol absolutely destroys the "stickiness."

The most successful alternate method and the one most generally used is simply to peel the plaster back from the skin and it should be turned clear back and not pulled up at right angles to the skin. A rapid "snappy" motion will usually succeed with less discomfort to the patient.

The adhesive mass is soluble in any of the usual rubber-solvents such as gasoline, benzol, chloroform and ether, and these are excellent for cleansing off any edges, specks or patches left after removal of the plaster.

If any of these are attempted as a means of removal of the plaster itself, it will be found that if the cloth is moistened with any of them, this cloth can be lifted right off but leaves the sticky mass upon the skin. This mass can now be gradually dissolved by repeated moistening with the solvent.

With extremely sensitive cases this method, while slow, may be found advisable. Gasoline is one of the best of these solvents and is scarcely irritating at all. Of course, it is inflammable.

Specifications for Adhesive Plaster

During the period of feverish buying by the Government at the time of the World War, dissatisfaction was experienced with some of the zinc oxide adhesive plaster purchased by the U. S. Army and Navy. Specifications were therefore sought for, with a view of establishing a standard of manufacture that would supply these departments of the Government with a satisfactory product.

The specifications of the United States Army were as follows:—

Composition—Adhesive plaster to be made of a composition containing not less than 30% of pure ground para rubber and not less than 20% of oxide of zinc free from lead and lead compounds. The mass to be free from nodules and evenly spread not less than 5 ounces not more than 6 ounces per square yard on a cotton cloth backing having not less than 150 threads to the square inch and weighing not less than 4 ounces, nor more than 5½ ounces per square yard.

Adhesiveness—Adhesiveness on hard wood of 5 square inches of plaster as determined by special appliance attached to tensile strength machine after plaster has remained 30 minutes at 37 degrees C. shall not be less than 40 pounds.

Adhesiveness on hard wood of 5 square inches of plaster as determined by special appliance attached to tensile strength machine after plaster has remained 6 hours at 75 degrees C. shall not be less than 40 pounds.

These specifications were found to be of distinct advantage and are still in use. The description of "composition" is satisfactory and those for the adhesive test are also excellent as far as that one made at 37 degrees C. is concerned, but the test at 75 degrees C. does not work out in a very satisfactory manner.

The Manufacture of Adhesive Plaster

The earlier processes for spreading adhesive plaster followed the methods used for diachylon plaster. The mass was dissolved in gasoline or other solvent to attain the desired fluidity and was then spread on the cloth by means of a scraper or knife and the solvent was then allowed to evaporate. This procedure does not produce a satisfactory plaster and the best plaster today is spread by means

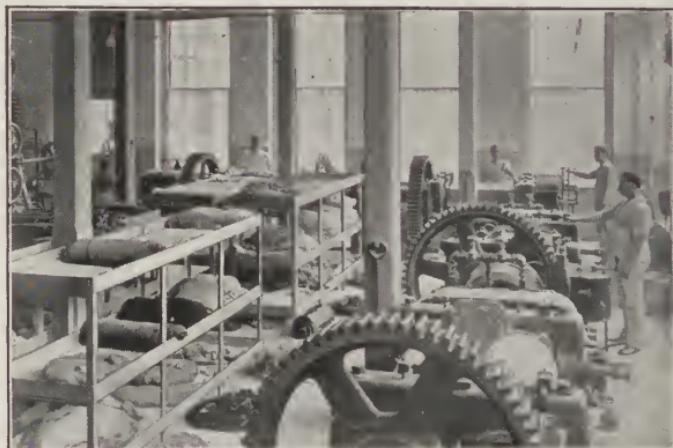


Fig. 1

of heat and pressure only. The cloth backing is fed through a pair of massive steel rollers that are hollow and supplied with interior connections for both steam and cold water so as to allow accurate temperature control.

At the same time the plaster mass is rolled in a thin film upon and into the cloth. The result is a smooth homogeneous mass spread evenly and at the same time pressed into the mesh of the fabric so as to be firmly adherent thereto. This requires very massive and expensive machinery and the greatest of care and good judgment, but if properly done, plaster so produced is of fine quality.

Also the quality of the plaster depends to a large extent upon the care, skill and experience used in selecting,

preparing and mixing the materials which are used to make the mass. Rubber, perhaps the most important ingredient, at least the basic one, is procurable in so many varieties and conditions that it has become hardly a name for a thing, at all. Only the highest grade natural Para rubber should be used and it is a requisite that it be thoroughly cleaned, washed, dried and conditioned for a period of several months before it is used in plaster-making. So with the pitch, gums, resins, waxes and pow-



Fig. 2

dered dry materials, all must be pure and of the highest grade and carefully selected and prepared for the purpose. In plaster-making too much heat or too little is ruinous in result. Poor mixing and especially a poor grade of rubber or one improperly prepared, may produce a plaster, fine in appearance, but after a year sadly lacking in adhesive qualities. On the other hand, an equally disastrous condition may take place in it so that the mass will have become too sticky, soft and utterly useless.

Surgical and Orthopedic Uses of Adhesive Plaster

In surgery, adhesive plaster plays a most important part. It is at once a covering, a dressing, a more or less water-proof protective and a substitute for or addition to the suture. It is well established that the judicious use of adhesive plaster tends to simplification of wound-dressing and that by its aid many cumbersome wrappings can be discarded.

Hamilton's adhesive plaster dressing for fracture of the patella is shown herewith (Fig. 3). A figure of eight



Fig. 3

adhesive plaster strap applied about patella, and padded splint on two retention straps above and below to immobilize leg and hold splint.



Fig. 4

In the Schmauss method as shown (Fig. 4), the two retaining strips one and one-half to two inches wide are placed in a figure of eight manner. The first is adjusted to hold the lower fragment up in place. The second strip is used to hold the upper fragment down against the lower. The third, a wide strip, is applied to cover the

patella and all intervening tissue between the two retaining strips, so as to overlap on to them. The object of this is to prevent tilting up of the fragments and to prevent constriction or swelling of (or effusion around) the patella.

Dr. Epstein's method of strapping for traumatic synovitis of the knee is shown in Fig. 5.



Fig. 5

A spiral adhesive plaster dressing for injury to the lateral ligaments is illustrated in Fig 6. The two dots indicate the two ends of the internal lateral ligaments.



Fig. 6

Strapping of the knee for sprains in inflammatory processes and rheumatic pains is explained by reference to Fig. 7. Adhesive straps one and one-half inches wide



Fig. 7

encircle knee, each strap slightly overlapping the other and crossed on the exterior surface in a half figure of eight.

The principle of reinforcement is utilized in strapping localized effusions as obtained in tendon sheaths, in bursae, in sprained or ruptured ligaments or muscles, in



Fig. 8



Fig. 9



Fig. 10



Fig. 11

The technic of adhesive plaster strapping reinforcement, as used by Finley R. Cook, M. D., is illustrated in Figs. 8, 9, 10 and 11.

Another double figure eight reinforcement strapping is shown in Fig. 12.



Fig. 12

haematomata and effusions in joints. For example, in strapping the knee for effusions, only one narrow strip is carried completely around the knee direct over the patella, making only moderate pressure on the vessels in the popliteal space, which at the same time affords a point d'appui for the remaining strips which pass two-thirds around the limb, meeting at a common point on the central strip beneath the hamstring tendons. This layer

makes an elliptical-shaped bandage, which exerts pressure on the tendons and lateral ligaments and does not interfere with the use of the joint. The second layer consists of several strips passing upward and downward obliquely over the anterior aspect of the knee, along the lateral borders of the patella. The third layer, the reinforcing



Fig. 13



Fig. 14

strips, are shorter and pass over the point in a transverse manner. Lastly, strapping with the use of the parts is an excellent form of massage. This may be the most important function of strapping.



Fig. 15

Fig. 16

Fig. 17

An interesting method of strapping the ankle joint is shown: Fig. 13, the first vertical and horizontal straps and Fig. 14, the completed dressing covering affected side—on the normal side the straps only cover the heel.

In the well-known Gibney method of strapping the ankle joint in sprains, one and one-half inch strips of adhesive plaster are applied in the manner illustrated,

Fig. 15 showing the first layer, Fig. 16 the second, and Fig. 17 the front view of completed dressing.

Dr. Lexer's method of applying adhesive plaster is explained in Fig. 18.



Fig. 18

Figs. 19 and 20 make plain the Keppler method of strapping for weak foot, the first showing the two long lateral strips and the second the completed dressing.



Fig. 19



Fig. 20

Dr. Dewey's suggestion for holding roller bandage in place is as per Fig. 21.

A method of retaining dressing on toe so as to obviate bandaging of the whole foot, as used by Dr. Brickner, is indicated by reference to Fig. 22.

In Fig. 23 is illustrated Dr. Epstein's technic for treat-

ment of flat foot. The patient is seated, the operator seated in front of him, the heel of the patient resting on the operator's knee. Two eighteen inch strips (2 inches wide) of adhesive plaster are made adherent overlapping



Fig. 21



Fig. 22



Fig. 23



Fig. 24

at one end and almost entirely divergent at the other. The small end of this bandage is applied to the ankle

under the external malleolus, the plaster brought under the arch of the foot so that the wider end reaches the inner side of the leg at a level with the head of the fibula. The foot is adducted. A retaining strap is placed transversely across the calf at the upper end of the dressing, while another is placed horizontally around the ankle above the malleoli. A one-inch strip is now wound in a



Fig. 25



Fig. 26



Fig. 27

figure of eight around the arch and ankle in the following fashion: Beginning under the external malleolus, down under the sole, up over the arch to the dorsum of the foot, around the tendo-achilles, around the ankle, over the dorsum and under the arch again. About six turns are thus consumed.

In Fig. 24 is pictured a method of using adhesive plaster for dressing ulcers of the leg by direct strapping. After application the notches are cut into the plaster to allow drainage.

Adhesive plaster is used for strapping the leg for ulcers

and varicose veins. To relieve the tension the straps are divided after application. Fig. 25 illustrates front view and Fig. 26 the back view, and also shows method of splitting the dressing to relieve tension.

A suggestion has been made for the use of adhesive plaster for the repair of wounds after removal of varicose veins. See Fig. 27.



Fig. 28



Fig. 29

Adhesive plaster straps may be used to maintain inversion of foot before applying plaster of paris dressing. Fig. 28 suggests a method of accomplishing this.

In Fig. 29 we have a proposal for adhesive plaster dressing for the correction of eversion of the foot in infants. A two-inch band is placed about the foot and along the tibia. On each of the strips a hook is sewn to which the tension strap, also of adhesive plaster, is hooked.

A method of using adhesive strips to close wounds after removal of tumorous growth of foot is explained by

reference to Figs. 30 and 31, the first before operation and the second after operation.

Adhesive plaster has been applied for the relief of hammer toe (Fig. 32) as shown in Fig. 33, the applica-

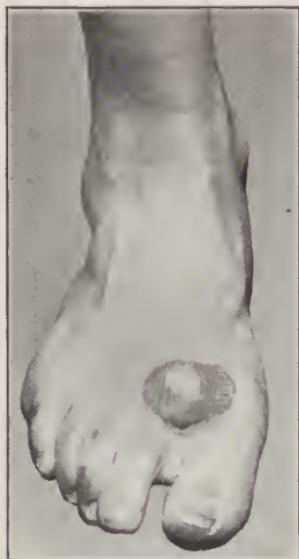


Fig. 30



Fig. 31



Fig. 32



Fig. 33

tion of adhesive straps serving to keep the toe straight.

Adhesive plaster strips have been used to advantage in treating ingrown toe nail. Fig. 34 shows method of traction by the strip which draws the flesh away from the nail and allows packing of the wound.

Dr. Lesser's technic in operation for ingrowing toe nail, referring to Figs. 35 and 36, is as follows:

After asepsis is complete and an Esmarch hemostatic bandage is applied, an incision is made, on both sides of the toe, separating the skin only as far back as the lower third of the nail or further if necessary; lay back the flaps and hold them back with wet sterile saline gauze. (As the vitality of this portion of the body is low, the sterile saline pad is preferable to dry dressing.) Next remove the tissue lateral to the nail. Begin the incision



Fig. 34

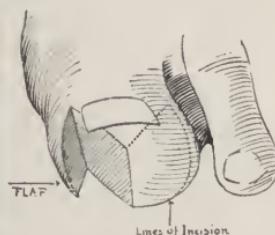


Fig. 35

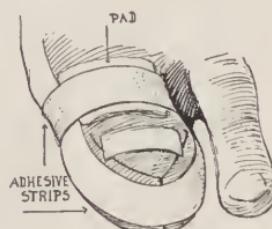


Fig. 36

at the distal end of the toe about 10 m. m. under the lateral margin of the nail, and continue it in a line obliquely outward to meet the point where the skin flaps are attached, taking care that the flap is not cut. The removed tissue is wedge-shaped, the base having been taken from the front of the toe and the point at the place where the skin flap ends.

After all bleeding is stopped lay the flaps on each side under the nail, and suture them or hold them there with narrow strips of sterile adhesive plaster. Stretch a plaster strip about 2 c. m. back of the flap to the same distance on the other side around the front of the toe.

Should the nail have been septic before the operation, place the strip of plaster low enough toward the plantar surface to allow the insertion of a small strip of iodoform gauze under the lateral margins of the detached nail; place the ends of the drain over the first layer of dressing. Use two layers of iodoform gauze dressing if the wound must be drained, the first under the ends of the

drainage gauze and the second over everything (each layer to be three or four ply). Cover all with a piece of gutta-percha tissue and tighten with adhesive plaster.

Illustrated herewith are three interesting suggestions



Fig. 37



Fig. 38



Fig. 39

for using adhesive plaster in the care of the feet, Fig. 37 a method of strapping for bunions, Fig. 38 a suggestion for corn on sole of foot, and Fig. 39 illustrates a procedure for strapping for fallen instep with a cushion on sole of foot, also made of adhesive plaster.

Barwell's method for talipes varus is as follows: Cut a piece of adhesive plaster into the shape of a fan, which is split into four or five strips converging towards the apex of the fan. The apex of the triangle is passed through a wire loop with a ring in the top, brought back upon itself and secured by sewing (Fig. 40). The plaster is firmly secured to the foot in such a manner that the wire eye shall be at a point where we wish to imitate the insertion of the muscle and that it shall draw evenly on all parts of the foot when the traction is applied. Secure

this by other adhesive strips and a smoothly adjusted roller.

The origin of the artificial muscle is as follows: Cut a strip of tin or zinc plate, in length about two-thirds of



Fig. 40

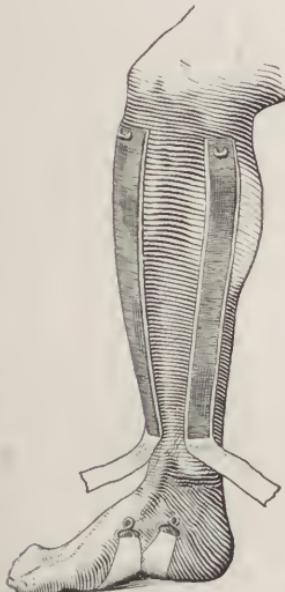


Fig. 41

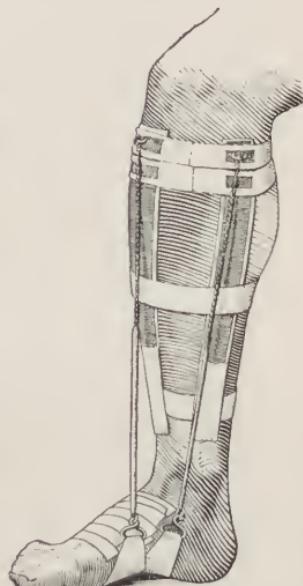


Fig. 42

that of the tibia, and in width one-quarter of the circumference of the limb. This is shaped to fit the limb as well as can be done conveniently. About an inch from the upper end fasten an eye of wire. Care should be taken not to have this too large as it would not confine the rubber to a fixed point.

The tin is secured upon the limb in the following manner: From stout adhesive spread on moleskin cut two strips long enough to encircle the limb and in the middle of each make two slits just large enough to admit the tin; then cut out a strip of adhesive plaster twice as long as the tin and a little wider. Apply this smoothly to the side of the leg on which the traction is to be made. Lay upon it the tin placing the upper end level with that of the plaster (Fig. 41). This is to be secured by fastening

the two strips just mentioned around the limb, then turn the vertical strip of plaster upwards upon the tin. A slit should be made in the plaster where it passes over the eye in order that the latter may protrude. The roller bandage should then be continued smoothly up the limb to the top of the tin. The plaster is again reversed and brought down over the bandage and the whole secured together by a few turns of the roller. A small chain a few inches in length containing a dozen or twenty links for graduating the adjustment is then secured.

Into either end of a piece of ordinary rubber tubing two to six inches in length and one-quarter inch in diameter hooks are fastened by a wire or other strong ligature (Fig. 42).

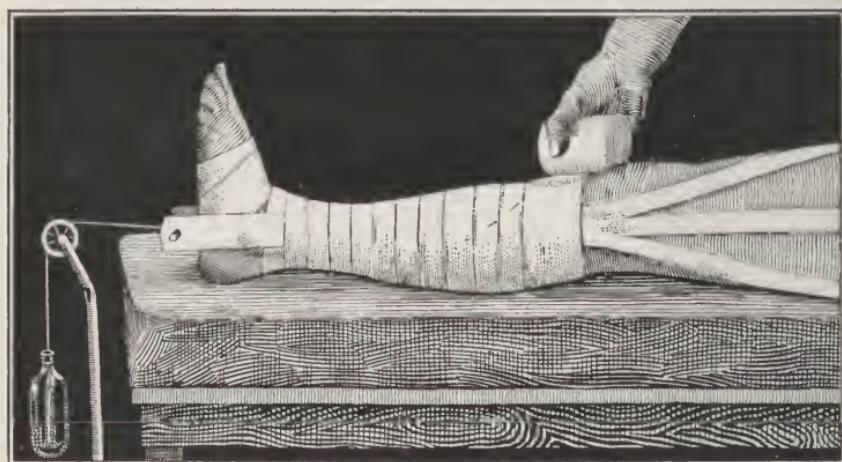


Fig. 43

There is an important field for the use of adhesive plaster in strapping for extension purposes. Herewith is illustrated (Fig. 43) a suggestion for the proper method of doing this work.

In Bryant's Extension method in treating fracture of the thigh, both the injured limb and the sound limb are flexed at a right angle with the pelvis, fixed by light splint and fastened to a bar above the bed. The weight

of the body produces counter extension and the patient can easily be cleansed. See Fig. 44.

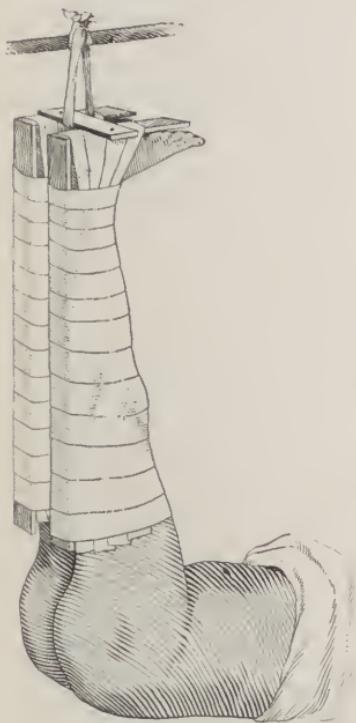


Fig. 44

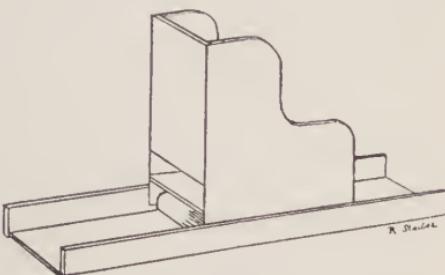


Fig. 45

Detail of foot-box used by Dr. Barety. See also Fig. 46.

An interesting event in surgical practice has been the publication of a thesis by Dr. Raymond-Jean-Theophile Steibel, Doctor of the Faculty of Medicine in Paris, entitled, "*La Véritable Extension Continue par l'Appareil de Jean Paul Barety.*"

In this thesis Dr. Steibel gives an extended explanation of the apparatus and the methods of Dr. Barety in cases of the fracture of the femur and coxalgies. Incidentally the publication pays great tribute to Dr. Jean Paul Barety of Nice, France, who prior to his death had devoted his life and his ingenuity to the improvement of apparatus for continuous extension. Notwithstanding his untimely death at the age of twenty-five, his biographer states that "the essential qualities of a

man of French science were in Jean Paul Barety. His work deserves the highest consideration. His death was cruel for his friends and cruel for science."

The following has been translated from the thesis cited:

"Adhesive plaster is an essential part of all forms of apparatus for continuous extension. It is through the medium of adhesive plaster that one can exercise traction of the limb and on its quality depends the greatest

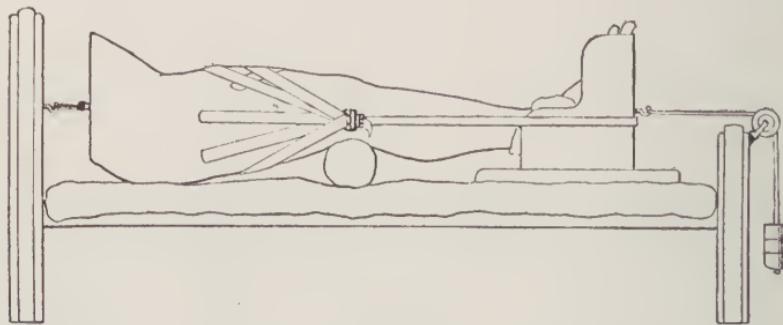


Fig. 46

Extension Apparatus Used by Dr. Barety

part of the success. The inherent defects of the adhesive plaster used up to the present time are sufficient in themselves to explain why the process of traction by adhesive straps has been so often criticized and abandoned. The adhesive often used in a little time caused erythematous excoriation of the skin, rendering it necessary to suspend the application of the extension.

"Diachylon plaster, the principal element of all so-called adhesive plasters, has a very complicated formula. The formulas laid down in the treatises on pharmacy do not allow of any purification of the ingredients, nor do they assure the sterility or the cleanliness of the product. It necessarily follows that the prolonged application of this product to the skin during weeks and months causes all kinds of irritation, itching and even suppuration. This undoubtedly is the principal cause

that has led to the abandonment of this system of traction.

"Suggestions have been made for the use of trusses and dressings more or less complicated, often constricting and usually expensive and at times intolerable for the patient.

"Jean Paul Barety, realizing this condition and attributing to it the fault of the adhesive plaster, determined to find a different product prepared with more system and less harmful. He first sought to simplify the old formula but without success. The products first used by him lacked adhesiveness, their application was modified by the surrounding temperature, a thousand precautions were necessary in order to make their application successful. During these investigations, Dr. Barety received one morning by chance a sample of American adhesive plaster of the manufacture of Johnson & Johnson, New Brunswick, N. J., designated as 'ZO' Adhesive Plaster. Dr. Barety made use of this plaster and the results were such that from that day he no longer used any other adhesive.

"Three years ago we made investigations to ascertain what was the composition of this product, its method of manufacture and utilization. The results of these investigations we are happy to make known as giving the best results. From the manufacturer we have learned that in the preparation of 'ZO' Plaster, improvements have been made not only in the quality of the rubber used but in the preparation of the other substances which make up the compound, and in these processes the impurities and harmful elements which make up the ordinary adhesives of commerce have been eliminated. The perfection of processes not only assures the adhesiveness of the mass but the efficiency of the plasters and produces a product which, at no matter what the temperature, the adhesiveness is quite rapid and the heat of the body is sufficient to increase without doing away with any of the qualities of the product.

"In the course of our studies we have tested some of the other products which we here cite. The table here shown is the result of applying the adhesive strips on a cylinder of thin rubber, the hollow of which was filled with fine sand, a depression being made on the surface in the axis of the cylinder.

Sample Nos.	Surface application in square centimeters	Traction in grams	Adhesive-ness in square centimeters
1....	30	4.750	158.33
2....	20	6.500	325
3....	20	8.980	449
4....	40	5.890	147.25
5....	25	7.600	344
6....	20	5.900	295

"In the course of our observations, and as a result of these additional tests, we have been able to make on the different adhesive products, we have never found a product whose fabrication is as perfect and as constant in its quality as 'ZO' Adhesive Plaster. Each time we have used this adhesive plaster we have always been able to establish our traction as strong as we have ever seen it, without ever being subject to the annoyance of slipping or non-adhesiveness or having to resort to any procedure. Finally, in the use of 'ZO' Adhesive Plaster we have never had any erythema or excoriation, nor have we ever been subjected to the necessity of ceasing the application of the extension. In a word, 'ZO' is a perfect product and all surgeons who have attempted to apply the apparatus devised by Dr. Barety for continuous extension for fractures of the thigh or coxalgia have the greatest interest and the greatest satisfaction in using this product, which is no other than No. 3 in the table shown."

In Fig. 47 is illustrated the use of reinforced strips encircling hand and thumb, for sprains, inflammation, etc.

Adhesive plaster for dressing in fractures and dislocation of metacarpal bone is well depicted in Fig. 48.

Reinforced adhesive plaster strapping of the carpo-metacarpal and metacarpophalangeal articulation of thumb is portrayed in Fig. 49, the first layer passing around the thumb over the hand to the starting point.



Fig. 47



Fig. 48



Fig. 49



Fig. 50

In Fig. 50 is indicated a simple dressing of wounds with adhesive plaster.

An adhesive dressing in fracture of phalanges is shown

in Fig. 51. A splint is used on the finger and this together with the finger is strapped firmly with the adhesive plaster.

Another method of retaining dressings on the finger



Fig. 51

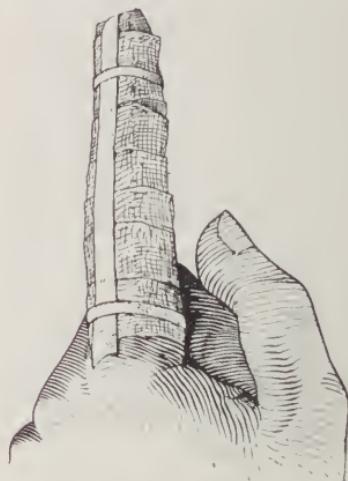


Fig. 52



Fig. 53



Fig. 54

by use of adhesive strips is portrayed in Fig. 52. This method also does away with the necessity for bandaging the entire hand to keep the dressing in place.

In bandaging the fingers Dr. Brickner advises only

sufficient bandage to hold the required dressing. See Figs. 53 and 54.

The last turn of the roller is made at the end of the dressing and here it is tapered by turning in the corners.



Fig. 55



Fig. 56



Fig. 57



Fig. 58

A strip of adhesive plaster not over one-fourth of an inch wide, and about twice the circumference of the finger is applied, not constrictingly, once around, to hold the end of the bandage. Another narrow strip of plaster is passed up one side of the dressing, over the tip and down the other side, and its ends are held down by a second turn of the first strip. Such a bandage is less unsightly, less uncomfortable, less wasteful than that usually applied; it covers only as much of the finger as is necessary, and the exposed joints are unimpeded (the last a matter of no small importance).

A suggestion of Dr. Brickner for the use of adhesive plaster in treating paronychia is illustrated in Fig. 55. This permits cleansing and drainage.

In Figs. 56, 57 and 58 are shown methods of strapping



Fig. 59



Fig. 60

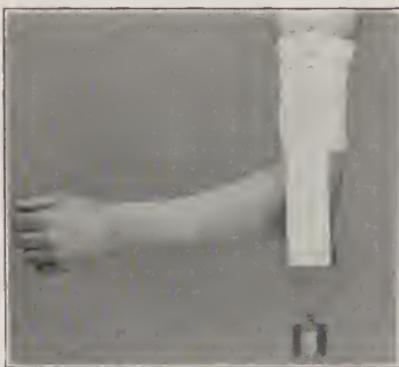


Fig. 61

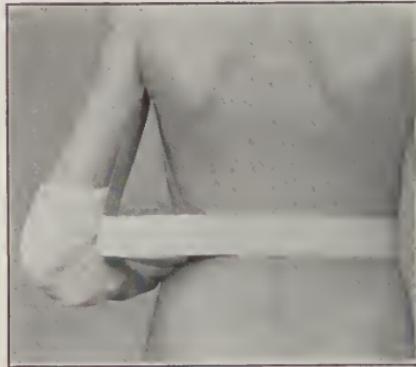


Fig. 62

with adhesive plaster for sprain of wrist. All are standard procedures in common use and need no description here.

For fracture or dislocation of olecranon, adhesive plaster has been used as in Fig. 59.

Dr. Lexer's idea for an immobilization dressing of area in fracture of radius and which still allows active motion, is indicated by reference to Fig. 60.

An interesting suggestion has been made (Fig. 61) for the application of adhesive plaster for extension and traction in fracture of the humerus. Note the weight hanging by means of a loop of plaster.

Fig. 62 is sufficient description of the use of a padded wooden triangle used in the axillary, the same being held in position by adhesive plaster, in fracture of the humerus.

In dislocation or sprain of elbow a two-inch strip of adhesive plaster may be used as shown in Fig. 63.



Fig. 63



Fig. 64

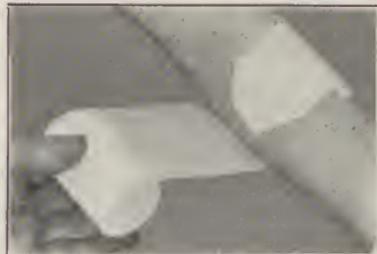


Fig. 65

For the prevention of slipping of roller bandages, two suggestions have been brought forward. One, Fig. 64, is described thus:—

Fix a roller bandage with three turns at the wrist; make turns until elbow is reached. Apply three adhesive strips one-half inch wide and to extend one inch beyond proximal and distal turns to the exterior or dorsal region of arm and apply gauze over it.

Another, Fig. 65, consists simply in fastening the end of the bandage to a piece of adhesive plaster to apply to skin surface at starting point.

Dr. Beck's suggestion for adhesive plaster as applied to Colle's fracture as shown in Fig. 66 includes the use of a round pencil or similar object to prevent adherence of ulna to radius.

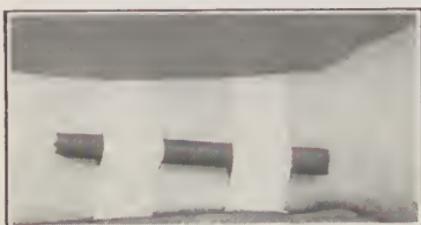


Fig. 66



Fig. 67



Fig. 68



Fig. 69

Dr. T. M. Bull used dumb-bell-shaped adhesive plaster for drawing wound edges together. This gives greater tension possibility (Fig. 67).

In Fig. 68 is illustrated strapping of shoulder with reinforcement in sprains and dislocations, compression and massage. Front view.

Fig. 69 shows one-inch strips drawn from a line on level of axillary fold to middle of scapula behind. Back view.

A method of placing half figure of eight reinforcing straps for sprain and dislocation is excellently portrayed

in Fig. 70. Cotton or gauze is placed in axillary fold.

In Stimson's dressing for dislocation of the outer third of the clavicle, three-inch plaster is used. See Fig. 71.

In Sayre's dressing for fracture of clavicle, Fig. 72,



Fig. 70



Fig. 71



Fig. 72

two straps of adhesive plaster are used three inches wide and long enough to reach one and one-half times

around the body—one strap encircles the arm below axilla and is carried around the back and across the chest. The other strip goes from the hand on the chest to the scapula.

Another method of plaster strapping for fracture of the clavicle, a figure of eight strapping, is shown in Figs. 73 and 74.



Fig. 73



Fig. 74

Dr. Bellamy describes and illustrates his method of dressing a fracture of the clavicle, as follows:

(1) A strip of adhesive plaster is cut out to resemble a claw, a little smaller than the size of the patient's hand, extending into a strap of the size of the wrist, this claw to be stuck to the skin about one inch in front of the pit of the invalid's shoulder, and should extend on an angle across the back, over a fulcrum between the scapula well around the front of the chest, thereby holding the shoulder backward and upward. (Fig. 75.)

(2) A strap about two inches wide, depending on the size of the patient, will, when folded, encircle the tip of the elbow and be attached to the front and back of the chest, elevating the shoulder about one inch higher than

the opposite one, and the hand of the injured side will be free and will rest over the upper part of the front of the chest (Fig. 76).

(3) A strap of similar width, i. e., a fixation strap which will cover the lower part of the elbow and extend around the chest so as to hold the arm in a position simulating Kocher's second position for dislocated shoulder, thereby tightening the pectoralis muscle and holding the inner fragments in place (Fig. 77).



Fig. 75



Fig. 76



Fig. 77

(4) A triangular band of cotton and gauze sufficiently large to keep the arm at the proper angle when hanging by the side; this angle can best be judged by noting the uninjured arm and shoulder.

(5) A pad of cotton and gauze sufficiently large to act as a fulcrum for the strap is very important.

When the dressing is properly applied the shoulder will be drawn upward, and backward; the position is imperative if the fragments are properly approximated. In using adhesive plaster the gauze covering should be stripped from the plaster only where it is to adhere.

Dr. Romer's method for treating fracture of the clavicle is illustrated in Figs. 78 and 79.

Three strips of firm adhesive plaster, each an inch and one-half in width, applied from above the nipple to below the angle of the scapula. The middle strip covers the

seat of the fracture and should be first applied; the lateral ones, slightly overlapping it, should extend about an inch and a half on either side. In addition to these strips it is advisable to apply another which encircles the shoulder-joint. To prevent chafing or the plaster adhering to the hairs a thin layer of wool should be placed in the axilla.



Fig. 78



Fig. 79



Fig. 80



Fig. 81

A dressing for fracture of sternum consists of two-inch adhesive strips to encircle chest with one reinforcing

strap crossed in front at site of fracture as per illustration in Fig. 80.

An adhesive plaster swathe for fracture of rib is shown in Fig. 81. Initial end is fixed at the spine, held taut and to go three-quarters of the way around the body. The plaster is to be wide enough to extend six inches on either side of fracture.



Fig. 82



Fig. 83



Fig. 84

In Figs. 82, 83 and 84, are illustrated three methods of using adhesive plaster for fracture of the ribs. Two-inch strips overlapping each other are used.

An adhesive plaster corset can be used for the maintenance of dressings and easy examination of a wound. This corset can be made for any required size. The edge for the insertion of the string is overlapped to prevent adhering, holes being punched in and the string drawn in like shoe laces. To make it neater, hooks may be sewn on as in a lace shoe, thus avoiding holes in the plaster. Fig. 85 represents the corset when open for examination of the wound, and Fig. 86 when closed.

Fig. 87 is a suggestion for an adhesive plaster support, used after appendicectomy, the strip used being four or five inches in width.

In Fig. 88 we have a method of application of adhesive plaster for support after celiotomy.

Dr. Garrison's method of applying adhesive plaster dressing for retaining umbilical hernia in infants is illustrated in Fig. 89.

In Fig. 90 is shown a standard method of dressing for umbilical cord. The gauze as applied, is twice as wide



Fig. 85



Fig. 86



Fig. 87

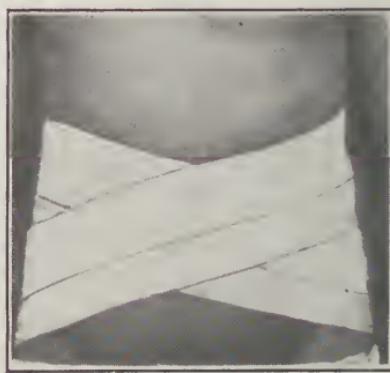


Fig. 88

as shown in the cut. There is a hole through the center of one half and after the cord is drawn through the hole, the other half is folded over the cord. The pad then assumes the appearance shown and the adhesive straps are applied.

Adhesive plaster straps have been used to approximate wound edges instead of using sutures. Fig. 91 illustrates

this and also the large adhesive plaster straps through which tape is drawn for the retention of final cover dressing.

In Fig. 92 is illustrated the so-called "sealer" of Dr. Evans as used in dressing laparotomies or celiotomies.



Fig. 89

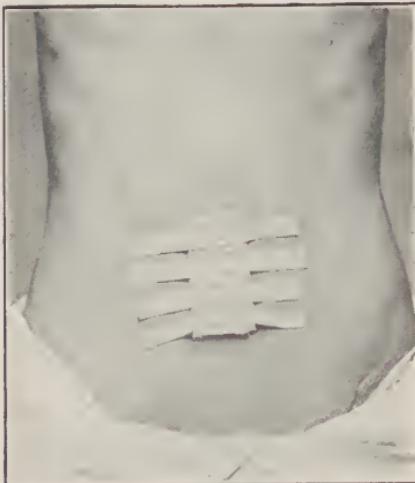


Fig. 90



Fig. 91



Fig. 92

Two-inch adhesive strips are placed in three sections. The upper one is placed one inch below the ensiform pro-

cess across the abdomen; the second across the umbilicus, and the third strip one inch above the shaved pubes.

Two strips, two inches wide and ten inches long are now used, the upper one, lapping the edge of the dressing one inch and the abdomen one inch. This secures the



Fig. 93



Fig. 94

upper edge of the dressing firmly. There is then attached a strip to the lower edge of the dressing and on the pubes one inch. This also secures this portion of the dressing and they both prevent the hand-borne infection, with which we are all so familiar.

The curious, investigating, time-killing patient's hands cannot find access to his wound and thereby contaminate and infect himself. The bellows action upon respiration is prevented; in so doing air and cuticle, etc., cannot reach the wound.

Dr. Grant describes a simple dressing which he uses as a substitute for the suture. This dressing is particularly adapted to contusions and lacerated wounds of the head (Fig. 93).

The dressing consists of strips of adhesive plaster, some ordinary old-fashioned dress hooks and some rubber bands.

The plaster should be either one-half or three-quarters of an inch in width. One or two hooks are used as may be necessary. More than two hooks to a strip does not work satisfactorily.

Make two holes for each hook to be used, the holes to



Fig. 95

be about one inch from the end of the strip of plaster, and one-quarter of an inch apart. The rings on the back ends of the hooks are to be open so as to better catch in the plaster. Turn the free ends of the plaster back on itself and make a double thickness under the hooks.

The plaster may be as long as is necessary to make proper tension, and it should be brought to within from one-half to an inch of the edge of the wound (Fig. 94).

When it is firmly fastened, begin lacing the rubber band from one hook to its fellow on the opposite side, drawing as tight as may be necessary to bring the lips of the wound together. If necessary, a gauze pad may be placed under the hooks.

For some time before his death Dr. Robert H. M. Dawbarn was using experimentally, in his work in the City Hospital of New York and in other institutions, a unique method of wound closure.

Dr. Dawbarn used as a method of wound closing Michel clips and adhesive plaster, alternately applied (Fig. 95). He used this method for every conceivable operation, with signal success and satisfactory cosmetic results.

For suturing the subcutaneous tissue the skin edges are closely proximated, with small forceps, and every inch along the line of incision a Michel clamp is attached. Between each clamp the skin is drawn together by adhesive strips (Fig. 96) which are sterilized over an alcohol



Fig. 96



Fig. 97

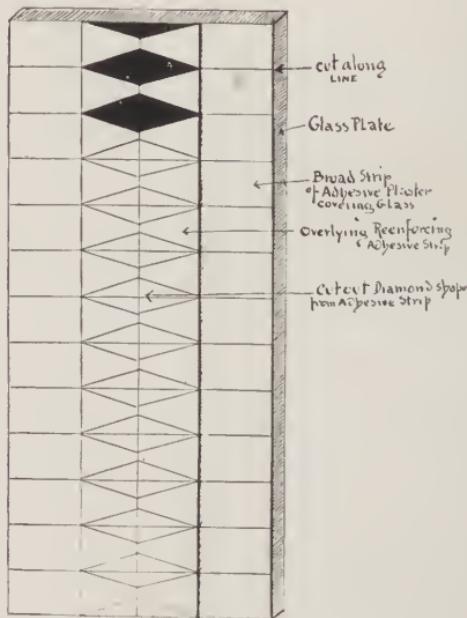


Fig. 98

flame (Fig. 97). This gives a minimum of adhesive surface directly over the wound, with a maximum of traction of the skin. The Michel clamps are removed after twenty-four hours, and the strips after ten days.

The strips of adhesive are made by taking a large strip of adhesive plaster from three and one-half to five inches wide, laying it on a glass plate, adhesive face downward (Fig. 98). Over this in the center, a smaller reinforcing strip, from one and one-half to two and one-half inches wide is laid for the purpose of giving additional strength. The pattern of the strips is laid out in lead pencil and then cut out.

He demonstrated that this method of wound closure preserves the integrity of the skin, prevents stitch abscess, does away with the painful removal of stitches and leaves a very small scar.



Fig. 99

In Fig. 99 is portrayed a method of closing the wound after breast amputation, using sterilized adhesive plaster.

Surgeons are called on frequently to operate on the anal region at a time when no assistance is available. Under such circumstances it is difficult to secure proper exposure.

Dr. Brun utilizes two adhesive strips about five and one-half inches (14 cm.) long by two inches (5 cm.) wide, according to the size of the patient's buttocks. (See Fig.

100). To one end, which has been folded upon itself, is attached a long strip of tape or bobbin. The other end is divided into three equal strips about three inches (7.5 cm.) long. The middle strip is then made a half inch (1.3 cm.) shorter.

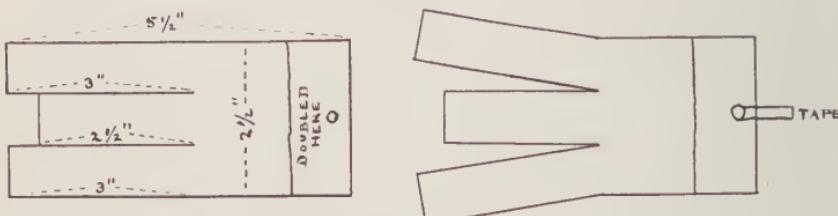


Fig. 100

The patient is put in the lithotomy position, knee chest position or bending over the table. The middle strip is attached at the side of the anus (the region being shaved), and the superior and inferior strips are fastened above and below. This procedure is repeated with the second strip on the opposite side. The patient now pulls the buttocks apart while the surgeon ties the tape at the head piece of the operating table.

Adhesive Plaster for Burns and Skin Grafting

Dr. Arthur S. Vosburgh was apparently the first to use adhesive plaster as a direct application to burns. His explanation of the method was before the New York Surgical Society as reported in the Transactions under date of February 28, 1912, viz:

"Dr. Arthur S. Vosburgh presented a man upon whom skin-grafting was done following the excision of a carbuncle on the back of the neck. The method employed was as follows:—The grafts were covered with zinc oxide adhesive plaster which was first sterilized in formalin vapor. These strips of plaster were placed close together, leaving a very small interval between them to allow for the escape of secretion. They were left in situ for a period of from six to eight days, the superficial dressings being changed as required.

"In commenting upon the method, Dr. Vosburgh said . . . The success of the operation depends primarily on the maintenance of cellular vitality; the grafts must quickly establish nutritional relations with the area covered and it was obvious that once placed in position the transplanted skin or epidermis should not be moved. Formerly, the grafts were covered with rubber tissue, silver or gold foil, or wide meshed tulle rendered non-absorbent with sterile paraffin, and a dry or moist sterile gauze, held in place by bandages, completed the dressing. Later, operators found that leaving the grafts exposed to the air, gave much better results, and this would be the ideal method were it not for the danger of the grafts becoming dislodged through some movement of the patient, intentional or otherwise. Attempts have been made to protect the grafts with a wire cage or some similar device, but the range of usefulness of this method was limited.

"Dr. Vosburgh said that having observed the behavior of epithelium in chronic ulcers that were covered by zinc

oxide adhesive plaster, he was led to apply this dressing directly over skin grafts. He had employed the method in a number of cases during the past year where it seemed impossible or at least improbable that any other form of dressing could be maintained in position, and it had proven successful on the back, the nates and in regions about joints. The speaker said all observers agreed that the superficial layers of skin grafts were exfoliated, and this often led the uninitiated to fear that the graft had failed. It was the separation of the graft into layers that rendered the success of this method possible.

Dr. Charles A. Parker, of Chicago, in the Journal of the American Medical Association, July 3, 1915, speaks of the need for quick healing in order to avoid great deformity and scar tissue which usually follows extensive burns. In burns involving the whole thickness of the skin the throwing off of the slough, which must take place before epidermidalization occurs, may take two or three weeks. When the slough is removed he treats the wound with adhesive strips in the following manner:

After separation of the slough, ribbons of adhesive plaster from one to one and one-quarter inches wide and long enough to encircle the limb and lap slightly were placed around the limb from ankle to perineum, leaving no granulations exposed (Fig. 101). To be more explicit, the first band was put around the ankle partly on good skin and partly on the burn, and the ends overlapped an inch or so. The next strip slightly overlapped the upper border of the first one, just enough to keep it from slipping on the wet tissues, and was carried around the limb like the first one. The third followed the second in a similar manner and so on till the area was entirely covered and had enough stability to stay in place and serve its function in keeping in the serum and preventing cells dying from dryness. Over this were placed several layers of gauze to take up the secretion that worked out through between the strips at various places, although no arrangement was made for drainage. At first narrow slits were left

open for drainage; but the granulations quickly occupied these areas, became exuberant and bled, and otherwise interfered with the healing; so the spaces were dispensed with entirely, with a much smoother course to the healing. Every day the gauze was changed as it became soiled.



Fig. 101

Twice a week—on my visiting days—the adhesive plaster was changed. This was easily accomplished by getting the blunt point of scissors under it at one end of the leg and cutting across all strips from the bottom to the top or the top to the bottom of the leg, when the plaster would fall from the leg as it was not adherent to the moist or granulating surface.

This adhesive dressing prevents exuberant granulations and, as he says, "allows a continuous growth of epithelium from the margins." This mechanical effect is an important one, as anyone who has had to control this condition knows. It does not adhere to the exposed surface, which is moist; it can be removed with little injury to new tis-

sues, bleeding rarely occurring. It prevents tissues growing into the gauze mesh.

Dr. Reat suggests the method shown in Fig. 102 and reports the case of an extensive burn (involving all the anterior portions of the body) where the skin, the subcu-

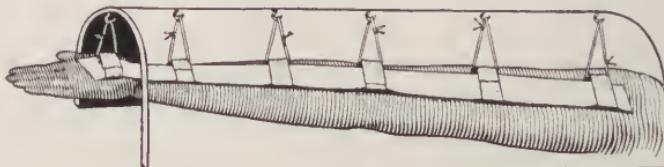


Fig. 102

taneous connective tissues, muscles and fascia of the palmar surface of the arm were all destroyed. The dorsal or upper portion of the arm was sound. Adhesive plaster was applied on the portion which had not been burned, from dorsum of hand to deltoid muscle, then loops of plaster were attached to the long strip with tapes through the loops. The arm was lifted up out of its slough and suspended by a semicircular form placed over and parallel with the arm, bringing the under surface to view. The recovery was rapid.

Therapeutic and General Uses of Adhesive Plaster

There are some things in medicine which will stand forever and those things are based upon rationalism. If we consider, for instance, a local injury such as a sprain or an inflamed joint, the indicated treatment must be protection, compression, limitation of motion and massage, no matter by what agent these factors are produced. The idea of rational medicine is the employment of agents which perform these functions in the most effective and



Fig. 103

Fig. 104

Fig. 105

most simple manner, and therefore the consensus of opinion declares adhesive plaster strapping to be the correct medium. As this is true of sprains and inflamed joints, a careful analysis with a receptive attitude and a due regard for therapeutic rules, soon manifests an unlimited number of conditions in which the same functions are necessary for relief and cure.

Illustrated herewith is the adhesive plaster belt of Dr. Rose for the treatment of gastrophtosis, enteroptosis, movable kidney, and many other causes of



Fig. 106

gastric atony. Fig. 103 illustrates application of first strap; Fig. 104, overlapping straps applied, belt complete, and Fig. 105, back view of completed belt.

Fig. 106 is a diagram indicating method of cutting out the belt and applying it.

The most essential and logical requirements in many forms of affections are protection and compression, and no appliance known in medicine provides protection and compression so uniformly and perfectly as adhesive plaster. The fact is evidenced by repeated and successful applications of adhesive plaster in inflammatory conditions which tend toward suppuration, such as mastitis, boils, carbuncles, ulcers, etc.



Fig. 107



Fig. 108

Dr. Hutchins has a suggestion for adhesive dressing for the cure of boil on back of neck. No incision is made. The narcotic spot is swabbed out with ninety-five per cent. carbolic acid and the whole area is covered with adhesive plaster. Dressing prevents crushing, increases phagocytosis, and prevents formation of "crop of boils." Fig. 107 shows the dressing lifted and Fig. 108 the dressing closed.

In Fig. 109 is depicted Dr. Duncan's method of removing smallpox pittings by means of carbolic acid and adhesive plaster.

The pock marks are covered with pure carbolic acid and

overlaid with adhesive strips and allowed to remain for two to three days while suppuration goes on underneath.

Dr. Hutchins suggests (Fig. 110) that X-ray burns can be treated by laying a piece of gauze over burn and covering with adhesive plaster.



Fig. 109



Fig. 110



Fig. 111



Fig. 112

Proper compression is one of the most efficient means of removing exudates due to the inflammation that follows functional or traumatic disturbances.

The suggestion has been made for a dressing for subcutaneous abscess (Fig. 111 shows the dressing lifted up

and Fig. 112 closed) as follows: After puncturing $\frac{1}{8}$ to $\frac{1}{4}$ inch beneath the skin, pus is pressed out and packed with gauze for drainage. Over all a round piece of adhesive plaster is placed. Serous flow is constant, no crust is formed, infection yields rapidly and granulation takes place.

In the treatment of ulcers of the leg, the use of rubber adhesive dressings may be considered as serving a two-fold purpose. The direct application of the plaster to the



Fig. 113



Fig. 114

ulcerated surface has a stimulating effect, evidenced by the production of healthy granulations and the formation of new skin from the periphery to the center. In the second place, the strapping properly applied, serves to compress and to support the dilated veins, thus preventing venous stasis, improving the circulation, and increasing the tonicity of the integument.

In the treatment of these ulcers which are so often associated with the presence of eczema, non-irritating adhesive plaster is an ideal application.

The pressure exerted by adhesive plaster produces a hyperemia which aids in carrying off or absorbing the

debris; and this soon clears the pathological condition which follows.

Applying salicylic acid over a surface to cover with adhesive plaster is shown in Fig. 113. This gives greater effect to the action of salicylic acid.

Compression limits the extension of the diseased portion of the body in cases of abscess and ulcers. A compression dressing of adhesive plaster confines the process of disease to the initial lesion and, in many cases, prevents suppuration.

Dr. Epstein uses an adhesive collar for torticollis and myositis of the neck and believes that the dressing immobilizes the neck muscles and spinal joints in children. See Fig. 114. The patient is held from behind. A thin layer of non-absorbent cotton is applied to neck; over this a wide Shaker flanner bandage is rolled; on top of this one inch adhesive plaster is brought all around the neck in a spiral fashion to stiffen the bandage. Another layer of flannel and adhesive plaster finishes the dressing.

In the presence of a painful joint, whether the pain is due to an inflammatory condition caused by systemic disease, such as rheumatism or gout, particularly in their sub-acute forms, or to actual traumatism of the joint, without penetration, or to injury of peri-articular tissues, rest is of the first importance. If the rest can be combined with even and steady compression an ideal method will have been obtained.

Fig. 115 suggests a method of strapping over a compression dressing for inflammatory affections of the joint, requiring rest as well as medication. After the dressing is applied, all is covered with cotton and gauze and strapped over with adhesive strips.

For a painful joint, compression may be well attained by the proper use of rubber adhesive dressings. It must be remembered that when we surround a joint with plaster, we nearly always cause some constriction of the limb, a procedure not without danger, particularly in inexperienced hands. To obviate this danger the dressing must

therefore be applied from below upwards, any dependent position of the limb must be avoided, and watchful care must be exercised.

The joints most frequently benefited by adhesive strapping are the phalangeal articulations, the wrist, the knee and the ankle. The wrist is very subject to sprains, and

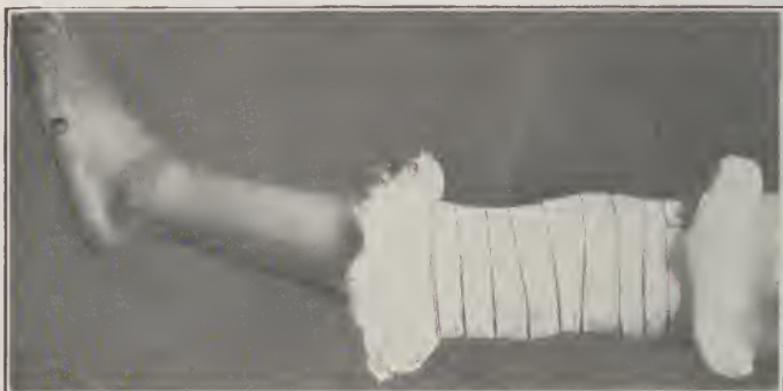


Fig. 115

a well-fitted adhesive plaster dressing gives more relief than any other mode of dressing. We know that any reasonable degree of constriction of the wrist is usually quite safe.

This procedure is adopted in sprains, synovitis, subacute rheumatism, and in teno-synovitis of the extensors of the thumb where they pass over the wrist joint.

Sprains of the knee joint when at all severe and accompanied by much pain, redness and swelling, seldom bear well the immediate application of a rubber adhesive plaster dressing. These bad sprains are best treated at first by rest, together with the application of either cold or hot dressing. As soon, however, as the swelling diminishes to some extent and pressure can be borne, an adhesive dressing may be applied.

In that lesion of the knee which is sometimes known as internal sprain, the adhesive plaster dressing is very useful. Inflammatory affections of the knee joint requiring rest, may all, except in the presence of suppuration,

be greatly benefited by the application of India-rubber adhesive plaster. In chronic inflammatory conditions the use of mercurial ointment is to be recommended. It is applied under a layer of oiled silk or rubber protective, which in turn is covered with a sheet of absorbent cotton held in place by a bandage. Then a rubber adhesive plaster dressing placed over the whole will secure rest and compression, and is often preferable to the plaster of Paris dressing.

Synovitis or anthritis of the ankle joint may frequently be benefited by a rubber adhesive dressing. Whether external or internal, however, the method advocated by Dr. Virgil P. Gibney, and which bears his name, and is illustrated elsewhere (Figs. 15, 16 and 17) is unquestionably the best method of treating sprains, as it restrains motion in any harmful direction, permits it where it can do no harm, affords support and acts as an artificial ligament, taking the place of the large lacerated structures. If the sprain is of any ordinary degree of severity, this dressing can be put on at once, so that a patient who, prior to its application, could not put his foot to the ground is often able to walk with comparative ease.

Many surgeons apply the Gibney dressing whatever may be the amount of pain or swelling, while others prefer to wait for a few days until by rest in the recumbent position and the application of cold or heat, the swelling has diminished. In general it is believed, however, that the Gibney dressing may be advantageously employed at any stage of the injury.

Immobilization is, without a doubt, the treatment par excellence in fractures of the long bones where perfect rest and immobility are essential to their union. But after union has taken place, and motion becomes imperative to prevent ankylosis and a regeneration of the parts, the application of adhesive straps, properly applied, will allow sufficient free movement with the necessary inhibition of overwork.

Many surgeons experience that a good functional result

is obtained by adhesive strapping of the part subsequent to a united fracture.

Ecchymosis, as is well known, is due to the rupture of minute blood vessels which permits the effusion of blood within the tissues. Pressure by means of an adhesive plaster dressing is an effective way of treating this condition. The pressure in itself will tend to cause mechanically the disappearance of the effused blood, but it is very likely that it also affords a certain stimulation to the blood vessels which tends to accelerate the absorption of the extravasation.

It is a well-known fact that pressure on an oedematous part will prevent to a great extent accumulation of the fluid. Owing to this well recognized fact we bandage the feet and legs of people suffering from oedema of these parts. A carefully applied adhesive dressing running from the extremity upwards, often serves the purpose very well, except in those cases in which the effusion is very considerable.

Varicose veins when located in the region below the knee joint, may often be greatly benefited by the application of an adhesive dressing. This should be put on from the toes upward. The skin in such cases is often very delicate, being prone to ulceration and eczema, and the use of non-irritating adhesive plaster is under these conditions indispensable. In some cases even when the patient wears an elastic stocking, the pressure of large bunches of veins in certain places gives considerable discomfort. This may be obviated to a considerable extent by the application of partial local dressings of adhesive plaster.

We illustrate (Fig. 116) strapping for the neurasthenic and rheumatic spine.

Adults suffering from backache with its multitudinous causes, whether they be spinal, pelvic, neurotic or reflex are greatly helped by strapping as shown in illustration. Two-inch strips of adhesive plaster are first applied

smoothly to the back in a vertical direction and from the root of the spine of the scapula to the coccyx. About three strips will be sufficient. Others are applied diagonally across the lower lumbar and sacral region from a level as high as the lowest rib as far down as the trochanters.



Fig. 116

This dressing should be applied with the patient in the standing position, should be kept on for about a week at a time, and its effect is very much enhanced by applying the Paquelin cautery over the spinal nerve roots before applying the plaster.

In pleurodynia, which is usually observed in the form of a sharp pain affecting the lateral thoracic walls, without being attended by any of the other physical signs of pleurisy, immobilization often gives instant and marked relief. The dressing should usually consist of the application of a three or four-inch strip, sufficiently long to

encircle two-thirds of the chest, and having its middle corresponding with the painful area.

In pleurisy the friction of the inflamed pleura against the chest wall appears to be one of the principal causes of the severe pain complained of. Hence it follows that by limiting this motion, relief should be experienced. Patients themselves often discover the fact, and show it frequently by lying upon the affected side, thus limiting the mobility of the thoracic wall.

Even in cases of pleuro-pneumonia the adhesive dressing may prove very beneficial, so long as the pain is a marked element. The limitation of respiration does not, as might be thought, exert an unfavorable influence, and the diminution of pain perceptibly alleviates the patient's exhaustion.

Some observers contend that in pleurisy with effusion the application of straps has served to aid in the absorption of the effusion.



Fig. 117



Fig. 118

Dr. Denison's method of using adhesive plaster in the treatment of pleurisy is illustrated herewith, Fig. 117 being his method of applying the plaster low down for relief of diaphragmatic pleurisy, and Fig. 118 his application of adhesive plaster for arrest of pleurisy in front and shrinkage of a large cavity behind.

Several cases of the use of adhesive plaster in pneumonia have been reported. Solberg reports a case wherein there was severe pain in the side and it was impossible to resort to an injection of morphine; upon the application of a strip of adhesive plaster the improvement was noticeable and surprisingly prompt, as in cases of fracture of the ribs.

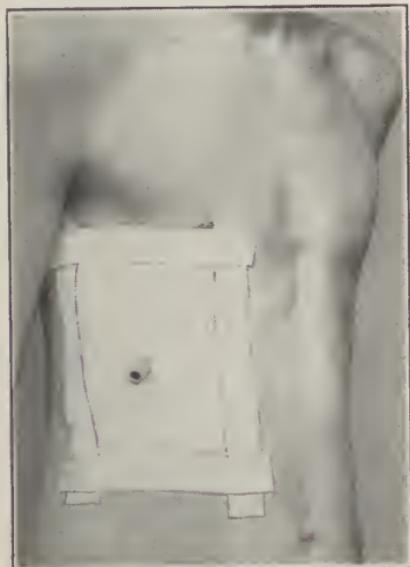


Fig. 119



Fig. 120

In subsequent cases of similar nature the treatment was employed with unvarying success.

Dr. Brucker's suggestion for a dressing for empyema is as follows:

After the usual dressing of gauze, cotton, etc., is applied, the same is covered with a piece of unsized, or washed cheese cloth or heavy gauze, larger than the dressing so as to overlap same or it can be unfolded or turned in, so as to get a good surface for the plaster to hold to. Then with two-inch wide plaster strips the edges are bound down to the skin, and the plaster is applied with half its width to the gauze and the other half to the skin; the ends are long enough to be covered by the next adjoining strip of plaster (Fig. 119).

Dr. Blackburn in describing his suggestion for the application of adhesive plaster in gastric neurasthenia, movable kidney, gastro-enteroptosis, etc. (Fig. 120) says: "When a patient refuses operation in movable kidney I have been in the habit of applying a dressing, consisting of strips of adhesive plaster.

This dressing is applied with parallel strips running from the median line in front to the median line behind, just as we would apply a dressing for fractured ribs, except that we begin just above the crest of the ilium and extend it well up on the ribs. With the patient in the recumbent position while this dressing is being applied, you can be certain the kidney is replaced; then to complete the dressing take a longer strip of the plaster, and, beginning at the lower anterior of the plaster already applied, run it diagonally around the body, completing it at the upper posterior border of the dressing. I have found that this dressing keeps the kidney in place better than any mechanical or rubber bandage yet devised, and is very successful in relieving the symptoms of gastric and general neurasthenia which results from movable kidney.

For bronchitis rubber adhesive plaster may be perforated and applied to the front of the chest as a protective agent and as a substitute for the well-known bergundy pitch plaster of former days.

The phenomenon of hiccough is commonly trivial, but occasionally we see a case in which it becomes so obstinate as seriously to exhaust the patient. Here the application of one or two fairly wide strips around the lower part of the chest will go far to modify its mobility and prevent the distressing succession of the body caused by the spasmodic contraction of the diaphragm.

In Fig. 121 is illustrated a suppurative strapping with adhesive plaster, for mastitis, using strips of plaster two inches wide and in Fig. 122 the same is used to include maintenance of a dressing of gauze.

In the treatment of affections of the breast compres-

sion is exceedingly valuable and by itself affords much comfort and relief, as long as there is no purulent collection. But even after an abscess has been evacuated, compression by means of rubber adhesive plaster serves to promote absorption, if so placed as not to interfere with appropriate drainage.



Fig. 121



Fig. 122

Proper bandaging and support in mastitis is a mode of treatment known to every practitioner and nurse. The application of a rubber adhesive plaster is an easy and effective way of accomplishing this result. Yet it must be stated that unless it is properly applied it will hardly prove as effective as the old-fashioned muslin or gauze dressing. A dressing which merely surrounds the breast can hardly exercise the necessary amount of compression. We must compress the gland in front by our dressing, and behind by pressure upon the thoracic walls.

When the breast is engorged with milk this method of dressing favors the discharge of the contents, and is preferable to the manipulation of the breast so commonly employed by nurses.

Fig. 123 depicts a compression dressing for the breast, the straps extending a little over the median line in the back.

In Fig. 124 is indicated a method of strapping the testicle in epididymitis and orchitis. The first step is the isolation of the inflamed testicle from the healthy one by means of an initial adhesive strap and the second step as shown is the completed dressing.



Fig. 123

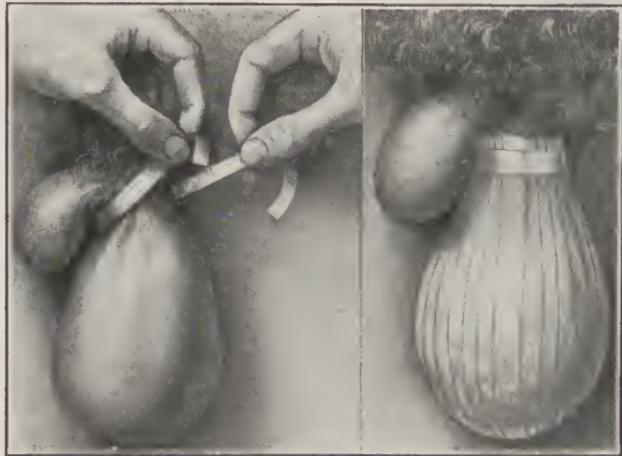


Fig. 124

Fig. 125 shows a scheme for fastening a dark cloth over the eye so as to leave the eye always ready for inspection. Fig. 126 illustrates an idea for dressing to protect the

eye, a watch glass being placed over the eye and held in place by the adhesive plaster.

In Dr. Newcomb's method of treating inversion (entropion) and trichiasis, adhesive strips three-sixteenth inch wide and long enough to reach the cheek bone, are used



Fig. 125



Fig. 126



Fig. 127

(Fig. 127). Collodion is applied over the plaster to prevent wetting of the plaster by tears.

Whenever pressure upon the skin is continued for a long time there is danger of irritation and abrasion. The application of a non-irritating adhesive plaster to the spot, forms an efficient protection and effective curative agent.

In this way adhesive plaster is a most effectual application for bed-sores, papillary growths and like conditions.

Dr. C. H. Powell, Prof. of Internal Medicine and Clinical Medicine, Barnes University, St. Louis, Mo., in a paper on the uses of adhesive plaster states that "at the present day there is no physician or surgeon whose satchel does not contain adhesive plaster of some make or size. There are many conditions in which the surgeon relies upon adhesive plaster, and I will refer generally to corns, bunions, swellings, mammitis, mammary abscess, inflamed joints, synovitis, ecchymoses, varicose veins, ulcers (in connection with antiseptics), frost bites, adenoids, boils, carbuncle and dozens of other conditions hardly necessary to mention.

"From a surgical standpoint the utility of adhesive plaster is generally recognized and universally employed. But from the standpoint of the general practitioner its advantages are often lost sight of, and reliance placed upon drugs that, although in the main useful, would often prove doubly so with the application to the affected part of some form of adhesive strapping.

"From the practitioner's standpoint I wish to refer to the following diseases that are invariably benefited by appropriate adhesive strapping: Orchitis, epididymitis, pulmonary, hepatic, renal and throat diseases, mastitis, inflamed joints from gout or rheumatism, pleural involvement, hiccough, neuralgia, mouth breathing, lumbago, gastrophtosis, enteroptosis, floating kidney, excessive sweating, tuberculosis, and a long line of dermatological affections as acne, comedones, eczema, tinea, circinata, lupus erythematosus, etc.

"The rationale of adhesive plaster therapy embraces several well-known therapeutical rules, including protection, limitation of motion in the underlying tissues, a mild form of massage, and undisturbed continuous drug application to an affected area. This latter property of plaster therapy is often entirely overlooked by even those who appreciate the inestimable value of adhesive plaster in therapy.

"I want to refer to another use to which I have applied 'ZO' Adhesive Plaster with most excellent results, and that is in the treatment of typhoid fever patients, especially in that class where the abdominal symptoms often stand out very conspicuously. I have upon more than one occasion employed 'ZO' Plaster over the entire abdomen of a typhoid patient, and have seen some well marked improvement invariably show itself. My reason for first applying adhesive strips to a typhoid case was, in the main, with the intention of immobilizing the abdominal muscles, thereby necessarily forcing the respiratory movements upon the intercostals and bringing about a change from the abdominal to the thoracic form of

breathing. Of course, in the female this is unnecessary, inasmuch as the costal type of respiration predominates, but in the male the opposite is the case.

"I have seen the tendency that existed in a given case to diarrhea materially overcome as soon as the plaster was put on. I have also seen the tenderness mitigated, and I believe the possibility to both intestinal hemorrhage and perforation are reduced to a minimum.

"As soon as I make the diagnosis of typhoid fever I put on the adhesive strips, usually employing the 'ZO' Adhesive Plaster, which from my extended experience with it, I have found thoroughly reliable and free from the usual objections that maintain with plasters in general. This is, of course, my individual experience with this form of adhesive plaster, and is not to be construed as being a reason why other plasters are not beneficial. I invariably, however, carry in my grip, the 'ZO' Adhesive Plaster.

Dr William H. Fitzgerald has been a strong advocate of the wide use of adhesive plaster in many conditions. It has been said about his work that "We have known for ages that pressure over a bony part may tend to relieve pain. Indeed we have made use of this fact in the past, by tenderly pressing upon the aching jaw, and, once the course of the nerves supplying the offending teeth have been learned, by exerting pressure upon the nerve. This procedure though, was a crude and elementary make-shift in comparison with the method developed by Doctor Fitzgerald for relieving pain, and, far more important, to remedy even more serious pathological conditions associated with pain."

Dr. Fitzgerald states that inhibition of irritation may be brought about oftentimes through pressure with adhesive plaster.

In the treatment of nose, throat and chest affections Dr. Fitzgerald strongly advocates the use of an adhesive plaster seal for the lips, to stop mouth breathing.

Several methods for sealing are illustrated in Figs. 128, 129, 130, 131 and 132. The procedure is especially applicable to little children and in some cases will soon correct the bad habit and can be discontinued. In such cases the plaster can often be applied after the child is asleep.



Fig. 128



Fig. 129

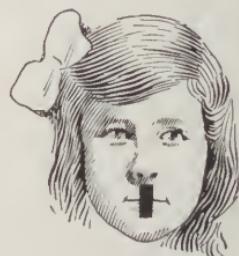


Fig. 130



Fig. 131



Fig. 132

Only the best quality non-irritating adhesive plaster should be used.

Dr. Charles W. Nehl, of St. Louis, Mo., reports a novel use for adhesive plaster. He states that a boy came into his office with his entire face studded with powder blown from a blank cartridge with which he had been playing.

The question to be solved was how to get these fragments out of the skin. Various means were tried to pick them out. This seemed an endless and painful job, so he thought of trying adhesive plaster. He saturated a towel in hot water, applied same to different parts, and immedi-

ately put small strips of adhesive plaster to different parts and left them applied for twenty-four hours, when upon removal it did exactly what he thought could be done with adhesive plaster. These strips when removed were literally covered with fragments of powder which could be easily seen under a magnifying glass. The entire face, ears, neck and nose, etc., were cleaned up in a hurry.

Dr. Nehl stated that the above application of adhesive plaster may not be of much use or probably of little interest, yet it might help some one out of a difficulty.

The Removal of Wrinkles

An important use has been found for adhesive plaster as a toilet accessory. Acting upon the suggestion of a very famous surgeon, the beauty doctors have proclaimed



Fig. 133

Fig. 134

Fig. 135

the fact that the use of adhesive plaster is one sure mode for the removal of wrinkles and for the clearing and beautifying of the complexion (Figs. 133, 134 and 135).

The technique of this use is very simple. Before retiring, the wrinkled skin is drawn tense with the first and second fingers of the left hand, while the plaster in narrow strips is applied over the surface parallel with the wrinkles. It is immaterial whether a wide or narrow strip is used except for convenience in treating wrinkles at the angles of the eye, between the eyes, etc. The plaster is allowed to remain until the following morning.

Mechanical Uses of Adhesive Plaster

Nowhere is there to be found stronger evidence that adhesive plaster fills an important need of the community than in the multitude of uses that are found for it in the mechanical trades, on the farm, in the office and the home.

It is safe to say that if a person has a spool of adhesive plaster at hand, it will constantly be called upon for

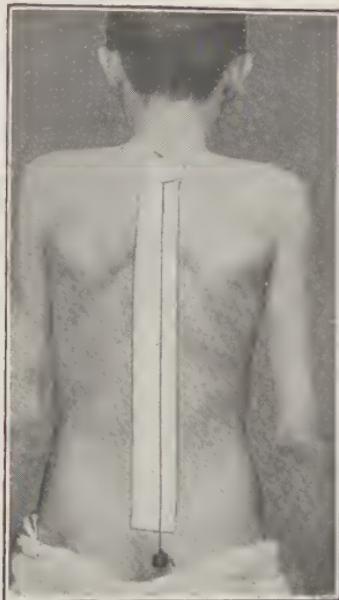


Fig. 136

mending and repairing. It is one of the few things that will stick to tin and it holds equally well on glass, porcelain, wood and metal. It is used continually for temporary repair of everything from fingers to axe-handles, from books to window-panes.

Whenever a cutting instrument must be used in a deep cavity in which the incision is to be limited and the operator must be guided almost entirely by the sense of touch, as, for instance, in evacuating certain tonsilar, palatine or retropharyngeal abscesses, it may be necessary to so protect the blade of the knife that only the point will be free, in order to avoid inflicting damage upon surround-

ing parts. A strip of adhesive plaster wound around the blade of the instrument and allowing only as much as is needed of the point to protrude, is far more efficient than wrapping with bandage or cotton.

A special use for adhesive plaster is as illustrated in Fig. 136, viz: Adhesive plaster strip for determining curvature of the spine. The strap is pasted along the vertebrae prominences and over this a plumb line is held in place by a strip of plaster on top.



Fig. 137

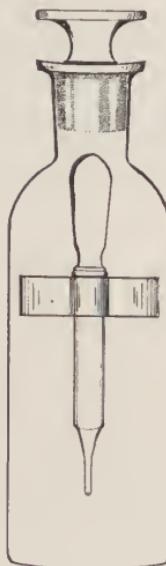


Fig. 138

Adhesive plaster is very useful for holding corks or stoppers firmly in bottles as illustrated (Fig. 137).

Illustrated herewith is a useful hint (Fig. 138), showing how to attach a dropper or pipette to a bottle, either for dispensing or for the physician's own use. When for use in the physician's office that part of the adhesive strip immediately over the pipette may be covered with gauze so as to prevent adhesion and thus allow removal and replacement of it, at will. After application the plaster may be coated with collodion or other varnish to prevent wetting.

FORMS OF ADHESIVE PLASTER

Adhesive Plaster, as made by Johnson & Johnson, is supplied in the following forms:

"ZO" ADHESIVE PLASTER



IN ROLLS

On Strong Cotton Cloth

One yard long, 7 inches wide.

Five yards long, 7 inches wide.

Five yards long, 12 inches wide.

On Moleskin

One yard long, 7 inches wide.

Five yards long, 7 inches wide.

Five yards long, 12 inches wide.

Ordinary (yellow) Rubber Adhesive Plaster on moleskin can be supplied in the same sizes as "ZO".

ON SPOOLS

2 $\frac{1}{2}$ YARDS LONG	$\frac{1}{2}$ inch wide
1 inch wide	1 $\frac{1}{2}$ inch wide

5 YARDS LONG	$\frac{1}{2}$ inch wide
1 $\frac{1}{2}$ inch wide	2 inches wide
1 $\frac{1}{2}$ inch wide	2 $\frac{1}{2}$ inches wide
2 inches wide	3 inches wide
2 $\frac{1}{2}$ inches wide	4 inches wide

10 YARDS LONG	$\frac{1}{4}$ inch wide
1 inch wide	1 $\frac{1}{2}$ inch wide
1 $\frac{1}{2}$ inch wide	2 inches wide
1 inch wide	2 $\frac{1}{2}$ inches wide
1 $\frac{1}{2}$ inch wide	3 inches wide
1 inch wide	4 inches wide

"ZO" ASEPTIC ADHESIVE STRIPS

Sterilized in Envelopes

$\frac{1}{4}$ inch wide, 10 inches long, 12 in env.

$\frac{1}{2}$ inch wide, 10 inches long, 8 in env.

1 inch wide, 10 inches long, 4 in env.

"ZO" CHIROPODIST PLASTER

Each Spool in wooden box

- 2 inches x 5 yards, $\frac{1}{8}$ inch strips
- 2 inches x 5 yards, $\frac{1}{4}$ inch strips

ZONAS ADHESIVE PLASTER

This is supplied either white mass ("ZO") or yellow (plain rubber) mass. The white mass is preferred for wound dressing, the yellow for mechanical purposes, though either can be used for both. White is always supplied unless otherwise specified.

ON CYLINDERS

- $\frac{1}{2}$ inch wide, 1 yard long
- 1 inch wide, 1 yard long
- $1\frac{1}{2}$ inch wide, 1 yard long
- 1 inch wide, 3 yards long, white only.

JOHNSON'S ADHESIVE PLASTER

IN ROLLS

- One yard long, 7 inches wide.
- Five yards long, 7 inches wide.
- Five yards long, 12 inches wide.

ON SPOOLS

5 YARDS LONG	10 YARDS LONG
$\frac{1}{2}$ inch wide	$\frac{1}{2}$ inch wide
1 inch wide	1 inch wide
$1\frac{1}{2}$ inch wide	$1\frac{1}{2}$ inch wide
2 inches wide	2 inches wide
$2\frac{1}{2}$ inches wide	$2\frac{1}{2}$ inches wide
3 inches wide	3 inches wide
	4 inches wide

JANUS ADHESIVE PLASTER

Double Faced, Toupee

This is supplied white mass on the one side and yellow mass on the reverse side. Used for affixing wigs and other mechanical purposes.

- 5 yard rolls, 7 inches wide.
- 1 yard, 3 pieces, 7 x 12 inches.
- Strips $1\frac{1}{2}$ x $3\frac{1}{2}$ inches, 12 in box.
- Spools $1\frac{1}{2}$ inch wide, 2 yards long.

DE LA COUR'S ADHESIVE PLASTER

(Diachylon Base, Emp. Plumbi)

On Strong Cotton Cloth

- 5 yard rolls, 14 inches wide.
- 1 yard rolls, 7 inches wide.

On Moleskin

- 5 yard rolls, 12 inches wide.
- 1 yard rolls. 6 inches wide.

Ligatures That Protect Your Results

THE name of Johnson & Johnson in connection with catgut sutures and ligatures is a guarantee to you of the care and precaution employed in their preparation.

Every step—from the minute the sheep intestine leaves the animal until the finished strand is ready for use—is a matter of painstaking surveillance and bacteriological test.



Section of the sterilization room of the Johnson & Johnson Laboratories. The high pressure steam sterilizer, shown in the foreground, has a normal working capacity of 10,000 tubes.

The careful surgeon may have absolute confidence, therefore, in Johnson & Johnson catgut. It is a perfect cord, made of healthy, normal animal tissue; sterilized and rendered aseptic, but unchanged in flexibility, tensile strength and other essential physical qualities; and absorbable without tissue reaction or interference with the healing process.

Is it any wonder so many of the country's most successful surgeons use Johnson & Johnson catgut in both private and hospital practice?

JOHNSON & JOHNSON, New Brunswick, N. J., U.S.A.

SYNOL SOAP

Designed primarily for hand disinfection in the operating room, the notable efficiency of Synol Soap for this purpose promptly led to its use in the many other directions in which a liquid antiseptic soap could be successfully employed.

Bland, soothing, and yet thoroughly dependable in its antiseptic and germ-destroying properties, the usefulness of Synol Soap has become so evident that many medical men make a

practice of keeping a supply constantly available in their offices, as well as in their operating and treatment rooms. A bottle is also an indispensable adjunct in their kit bags, for they have found it invaluable in the routine of daily practice, in attending obstetrical cases, or patients with wounds, foul sores, malignant diseases, etc.

In countless other conditions Synol Soap has proven of equally gratifying service to the practitioner. It is not surprising, therefore, that so many medical men have come to rely on Synol Soap for innumerable purposes, and they have found it an in-

valuable addition to their armamentarium.

Sample on Request

JOHNSON & JOHNSON, New Brunswick, N. J., U.S.A.



GAUZE FIT FOR SURGERY

Gauze for surgical uses should be especially made for the purpose; it should have a soft, even thread and contain no kind or sort of filling or dressing, and it should be standardized as to mesh, quality and size.

It should be woven from yarn made of good clean white cotton and of first importance is the question of adequate absorbency. These requirements are assured in the Johnson & Johnson product.



All the regular packages of dry gauze, sterilized after wrapping, are prepared in the following units: 1 yard in a carton, 5 yards in a carton and 25 yards in a carton.



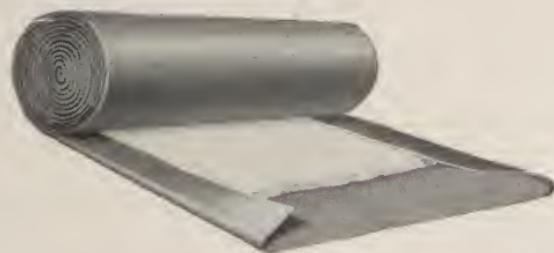
The glass container in which Linton Moist Gauze is packed insures perfect protection in transportation, sale and use.

Linton Moist Gauze, one yard or five yards in glass jars, is supplied in the following medications: Borated Gauze, Carbolated Gauze, Corrosive Sublimate Gauze (1-1000 or 1-2000), Iodoform Gauze, 5 per cent., Iodoform Gauze, 10 per cent., Picric Acid Gauze.

JOHNSON & JOHNSON, New Brunswick, N. J., U.S.A.

Keeping Your Cotton Clean

A Unique Feature That Protects
The Unused Cotton in the Roll



Note the "famous flap" that encloses the ends and prevents exposure to contamination.

The ordinary roll of cotton with its exposed edges makes soiling inevitable and presents a constant invitation to infection. Our cotton, with its "famous flap" and perfectly covered edges, allows the practitioner to remove as much or as little as he wants each time, without exposing the balance of the roll to contamination. The medical man who insists on Johnson & Johnson cotton has the constant satisfaction of knowing that he can keep the unused portion clean and unsoiled until the package is completely used up.

*Supplied in one-pound, half-pound, four-ounce
two-ounce, one-ounce, and half-ounce cartons.*

JOHNSON & JOHNSON, New Brunswick, N. J., U.S.A.

Camphenol in the Sick Room

PHYSICIANS and nurses, in hospitals and private practice, have agreed upon Camphenol's value as a disinfectant during and after contagious disease cases.

The germ-destroying power of Camphenol is about three times that of carbolic acid used in the same strength. Although powerful and energetic as a germicide, Camphenol is not corrosive, and will not destroy clothing or furniture. It leaves no stain.

Some of Its Uses



For the emersion of all washable articles used in the sick room, and for disinfection of all utensils, a three to five per cent solution should be used.

For washing the hands of nurses and others who have been in contact with infected cases, a two per cent solution is effective.

For the disinfection of excreta in typhoid fever; sputum in diphtheria, tuberculosis, etc., a solution of five to ten per cent should be employed.

For scrubbing floors and wood-work of rooms, in connection with fumigation, a solution of one to two per cent is effective.

For use as a general disinfectant and deodorant, a five per cent solution may be used.

Obtainable at all Drug Stores

Samples on Request

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